

Remarks:

These remarks are responsive to the Office action dated March 11, 2005. Prior to entry of this amendment, claims 1-26 and 33-36 remained pending in the application. Claims were withdrawn (with traverse) pursuant to an earlier restriction requirement. Claims 28, 29, 31 and 32 were cancelled (without prejudice), also pursuant to the earlier restriction requirement.

In the Office action, the Examiner rejected claims 1, 2, 6, 10, 11, 18, 19, 21 and 22 under 35 U.S.C. 102(b) as being anticipated by Slysh (U.S. Patent No. 5,147,680), and rejected claims 1-26 and 33-36 under 35 U.S.C. 103(a) as being unpatentable over Drazl et al. (U.S. Patent No. 6,565,927 B1) in view of Slysh. The prior restriction requirement was made final.

Applicants have cancelled claims 27 and 30 (without prejudice) in view of the finality of the restriction requirement. Claim 11 has been amended to correct a typographical error. Claims 1-10, 12-26 and 33-36 remain unchanged.

In view of the remarks below, applicants respectfully request reconsideration of the application under 37 C.F.R. § 1.111 and allowance of the pending claims.

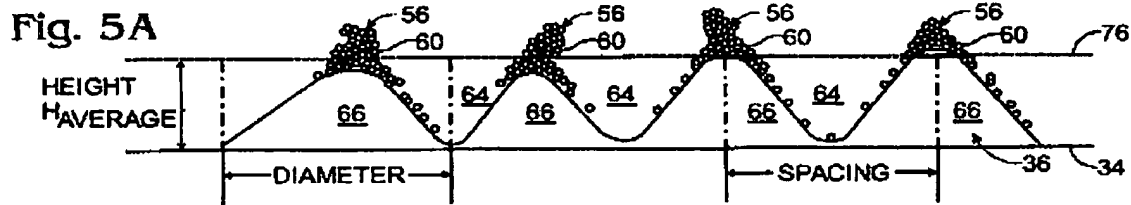
Rejections under 35 USC § 102

The Examiner rejected claims 1, 2, 6, 10, 11, 18, 19, 21 and 22 under 35 U.S.C. 102(b) as being anticipated by Slysh (U.S. Patent No. 5,147,680). For the following reasons, applicants traverse these rejections.

Independent claim 1 of the present application recites "providing an initiator which is configured to shadow a portion of a surface of a substrate." Initiators, according to the present application, are "the precursors of structures formed by the ablation process" (p. 8, lines 6-7). These structures also are referred to as "cones"

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(p. 8, line 13), and thus the initiators also may be referred to as "cone initiators" (p. 9, line 24). Fig. 5A of the present application schematically illustrates cone structures being formed by ablation debris cone initiators, according to aspects of the present invention:



As Fig. 5A indicates, ablated material 60 may serve as a cone initiator 56 to form cones 66. However, for the ablated material to serve this purpose, the radiation applied to the substrate must be chosen to have appropriate characteristics, as described below.

The Examiner states that because some dependent claims of the present application are directed towards using substrate material that has been ablated as an initiator, use of such an initiator is inherent to the laser ablation process. Applicants respectfully disagree. To be inherent, a feature of the claimed invention must be "necessarily present" in an anticipating reference. *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268 (Fed. Cir. 1991). Using ablated material as an initiator is not inherent in Slysh, because to do so involves tuning the fluence of laser radiation so that the radiation causes ablation of the substrate, but not substantial ablation of the previously ablated material. Selecting a fluence in this range is not necessarily present in the laser roughening process of Slysh.

More specifically, the present application states that "[b]y adjusting the laser to a fluence below the ablation threshold of the debris 88 but above the ablation threshold of the substrate 87, the surface of the substrate not shielded by the debris may ablate while the substrate material shielded by the debris does not ablate" (p. 11, lines 24–27). Slysh does not teach adjusting the fluence of a laser between the ablation thresholds of a substrate and its ablation debris, and a fluence in this range is not a necessary feature of the laser roughening process taught by Slysh. Thus, use of an initiator is not inherent to laser ablation as taught by Slysh.

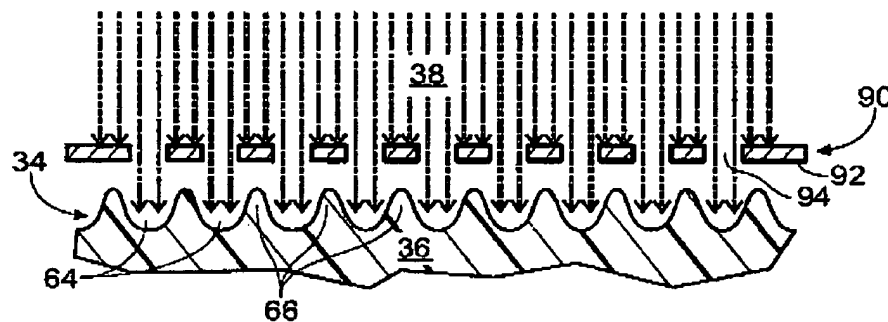
A similar analysis applies to independent claims 10, 18 and 21 of the present application. Claim 10 recites "further directing laser radiation towards the surface of the substrate at an intensity sufficient to cause ablation of the substrate, but not sufficient to cause substantial ablation of the debris, thereby forming structures on the surface of the substrate." Claim 18 recites "adjusting the fluence of the laser between an ablation threshold of the substrate and an ablation threshold of the ablation debris." Claim 21 recites "adjusting the laser to ablate the low threshold ablation region at a rate faster than ablation of the high threshold ablation region in order to form structures on the surface." Since Slysh does not teach any of these features, and since the features are not inherent to the process taught by Slysh, applicants do not believe that Slysh anticipates any of claims 1, 2, 6, 10, 11, 18, 19, 21 or 22.

The Examiner also asserts that Slysh teaches using a mask to control the areas of ablation. Applicants disagree. Slysh teaches "laser melting of maskant to enhance adhesion of the maskant" (abstract), and that "the scanned laser beam trims and shapes the edges of the maskant" (col. 2, lines 15–17). However, Slysh

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does not teach the use of maskant as an initiator or precursor of structures formed by the ablation process, in the manner claimed by applicants. Applicants describe the use of a mask 90 that "includes a plurality of gaps 94 defined by a plurality of features (initiators) 92" (p. 16, lines 8–9), as depicted in Fig. 7 of the present application:

Fig. 7



Slysh does not disclose a mask having a plurality of features that could function as initiators, nor is such a mask inherent in the process described by Slysh. Therefore, applicants do not believe that the maskant described by Slysh anticipates the initiators of the presently claimed invention.

Rejections under 35 USC § 103

The Examiner rejected claims 1–26 and 33–36 under 35 U.S.C. 103(a) as being unpatentable over Drazl et al. (U.S. Patent No. 6,565,927 B1) in view of Slysh. For the following reasons, applicants traverse these rejections.

As the Examiner notes, Drazl teaches providing water, preferably with ozone dissolved in the water, on a surface to be modified prior to irradiating the surface with UV radiation. However, the water taught by Drazl is not an initiator as defined and claimed by applicants. As noted above, initiators of the present application are "the precursors of structures formed by the ablation process" (p. 8, lines 6–7), whereas the purpose of the water applied to a substrate by Drazl is "liquid cooling" (col. 4, line 5), or to "assure[] that the substrate [] does not overheat" (col. 8, 33–34). Drazl also teaches that application of water "enhances the modifying of the surface during the irradiating of the surface" (claim 1). Drazl thus specifically contradicts the purpose of applicants' initiators, which is to slow modification of the surface in the region of each initiator. Drazl does not disclose using water droplets as cone initiators, nor is such a use inherent in the use of water droplets used for cooling a surface.

The Examiner also states that Drazl is silent as to the applied optical energy being in the form of a laser. Applicants respectfully disagree, and assert that in fact Drazl teaches away from using a laser. Specifically, Drazl states as motivation for using UV radiation that although lasers have been used for surface treatments, "[t]he focused beams of the lasers make it difficult to treat a large surface" (col. 1, lines 51–52). Thus, applicants do not believe it would have been obvious to a person of ordinary skill in the art of surface modification to combine the disclosure of Drazl, which specifically teaches away from using a laser, and which claims applying water droplets to a surface primarily for the purpose of cooling the surface, with the laser roughening process taught by Slysh, to arrive at applicants' claimed invention.

Applicants believe that this application is now in condition for allowance, in view of the above amendments and remarks. Accordingly, applicants respectfully request that the Examiner issue a Notice of Allowability covering the pending claims. If the Examiner has any questions, or if a telephone interview would in any way advance prosecution of the application, please contact the undersigned attorney of record.

Respectfully submitted,

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CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that this correspondence is being facsimile transmitted to Examiner E. Fuller, Group Art Unit 1762, Commissioner for Patents, at facsimile number (703) 872-9306 on June 10, 2005.



Christie A. Doolittle

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